

Final
January 24, 2017

City of Santa Barbara
Water Supply Management Report
2015-2016 Water Year

Prepared by Water Resources Division, Public Works Department





City of Santa Barbara Water Supply Management Report 2016 Water Year (October 1, 2015 – September 30, 2016)

Water Resources Division, Public Works Department
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INTRODUCTION

The City of Santa Barbara operates the water utility to provide water for its citizens, certain out-of-City areas, and visitors. Santa Barbara is an arid area, so providing an adequate water supply requires careful management of water resources. The City has a diverse water supply including local reservoirs (Lake Cachuma and Gibraltar Reservoir), groundwater, State Water, desalination, and recycled water. The City also considers water conservation an important tool for balancing water supply and demand. The City's current Long-Term Water Supply Plan (LTWSP) was adopted by City Council on June 14, 2011.

This annual report summarizes the following information:

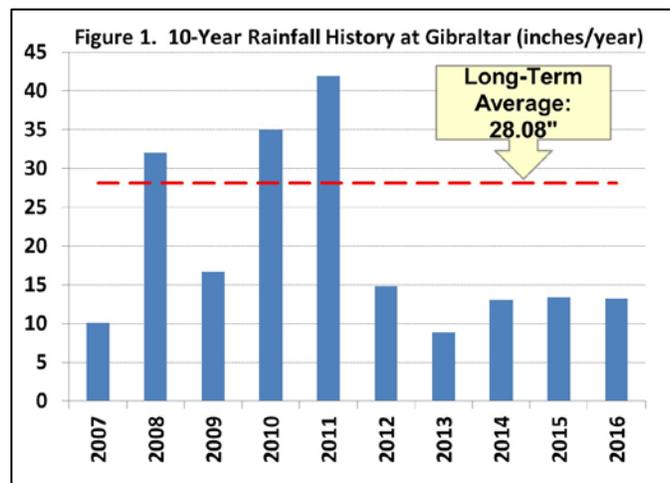
- The status of water supplies at the end of the water year (September 30, 2016)
- Drought outlook
- Water conservation and demand
- Major capital projects that affect the City's ability to provide safe clean water
- Significant issues that affect the security and reliability of the City's water supplies

Appendix A provides supplemental detail. Additional information about the City's water supply can be found on-line at: www.SantaBarbaraCA.gov/Water

WATER SUPPLIES

The City has developed five different water supplies: local surface water; local groundwater (which includes water that seeps into Mission Tunnel); State Water; desalinated seawater; and recycled water. Typically, most of the City's demand is met by local surface water reservoirs and recycled water; and augmented as necessary by local groundwater and State Water. The City's desalination facility has been off-line and is currently under construction for reactivation due to drought conditions.

The City's local surface water comes from Gibraltar Reservoir and Lake Cachuma, both of which are located in the upper Santa Ynez River watershed. The inflow to these reservoirs is rainwater, so rainfall data for Gibraltar Reservoir is important for water supply management purposes. Figure 1 shows rainfall for the past ten years as compared to the 50-year average. Additional historic information is



included in Appendix A. Runoff generated by average rainfall is generally enough to fill Gibraltar; however, it typically takes above-average rainfall to produce any significant inflow to Cachuma. Rainfall in the Santa Ynez River watershed during 2016, as measured at Gibraltar, was 53% below average, and the last five water years (Oct 2011-Sep 2016) have received the lowest cumulative rainfall in recorded history for a consecutive four-year period. Over the last five years, there has been very little inflow to Lake Cachuma. To enhance rainfall, the City participates in the cloud seeding program administered by the County of Santa Barbara. However, cloud seeding only works when there are storm events, of which we have seen very little in the last five years.

Table 1, below, summarizes the status of the City's various water supplies at year-end.

Table 1. End of Year Status of City Water Supplies	
The Water Year runs from October 1 through September 30. All data is as of September 30, 2016.	
Lake Cachuma	Total Capacity: 184,121 AF (2014 survey for 750' elevation) End of Year Storage: 14,222 AF (8% of Total Capacity) The City's share of the Cachuma Project's normal annual entitlement is 8,277 AF. Due to drought conditions, the entitlement in WY 2016 was reduced 100% to 0 AF and all Cachuma water used by the City was carryover water from previous years. Actual City use was 2,993 AF; Total remaining carryover for the City as of September 30, 2016 was 1,410 AF.
Gibraltar Reservoir	Total Capacity: 5,246 AF (2016 survey) End of Year Storage: 559 AF (11% of Total Capacity) Gibraltar Reservoir typically fills and spills two out of every three years. Due to drought conditions, the last time Gibraltar spilled was May 2011. There were no deliveries from Gibraltar in 2016. The projected long-term average is 4,330 AF under Pass Through Operations ¹ .
Mission Tunnel	Groundwater that seeps into Mission Tunnel is an important part of the City's water supply, providing 574 AF in 2016, about 49% below the long-term average of 1,125 AFY ² .
Ground-water	Groundwater levels are lower than normal and are not expected to recover until drought conditions end and groundwater can be replenished during wetter years. Eight out of nine potable production wells were available for use, and the City used 2,867 AF of groundwater in 2016.
State Water Project (SWP)	The City has a 3,300 AF "Table A" allotment (with drought buffer), subject to availability. In 2016, the State's Table A allocation was 60%, or 1,980 AF for the City. In response to state-wide drought conditions, the City purchased supplemental water conveyed via the SWP. The Coastal Branch and Santa Ynez Extension of the SWP are in place to deliver the City's water into Lake Cachuma. The City used a total 3,113 AF of supply via the SWP in 2016. No water was exchanged with Santa Ynez River Water Conservation District, Improvement District No. 1 (ID#1) pursuant to the Exchange Agreement because ID#1 did not have any Cachuma water available to exchange.
Desal	The desalination plant has been offline but is permitted to provide up to 10,000 AFY of supply. In July 2015, the City awarded a design and construction contract for plant reactivation in order to provide 3,125 AFY of supply (construction anticipated to be complete in Feb-March 2017).
Recycled Water	The City's recycled water system serves parks, schools, golf courses, other large landscaped areas, and some public restrooms. Demand from the system was 741 AF, or 7.3% of the total customer water demand, plus 178 AF of process water at El Estero Wastewater Treatment Plant (EEWTP). In 2015, the recycled system demands were supplied by 64 AF of potable blend water and 22 AF of non-potable groundwater, which is a significant reduction in blending compared with previous years. Construction of an upgraded tertiary filter system was completed in October 2015 to eliminate or significantly reduce the need for potable water blending.

¹ Stetson, 2013. *Hydrologic Analysis of the Pass Through Operations at Gibraltar Reservoir*. Prepared for the city of Santa Barbara. July 2013.

² SWRCB et al., 2011. *Final Environmental Impact Report for the Cachuma Project Water Rights Hearings*. Prepared for the State Water Resources Control Board. December 2011.

DROUGHT OUTLOOK

Because the City depends heavily on local surface water, our water supply reliability is vulnerable to prolonged drought. Lake Cachuma is our primary source of surface water and its storage level is the most important indicator of drought impacts. Figure 3 shows a recent history of storage levels at Lake Cachuma, which has now reached a historic low. The severe drought period of 1987-1992 is also shown for comparison. Cachuma members normally begin to take voluntary reductions in deliveries when the reservoir storage drops below 100,000 AF as a way of stretching supplies in case drought continues. In 2016, the Cachuma allocation was reduced to 0% of normal entitlement, and all of the City's remaining Cachuma water consisted of water saved and carried over from previous years. The City's current entitlement for WY 2017 is also 0 AF, which is the second consecutive year of a Zero allocation, reflecting unprecedented drought conditions.

Figure 3.

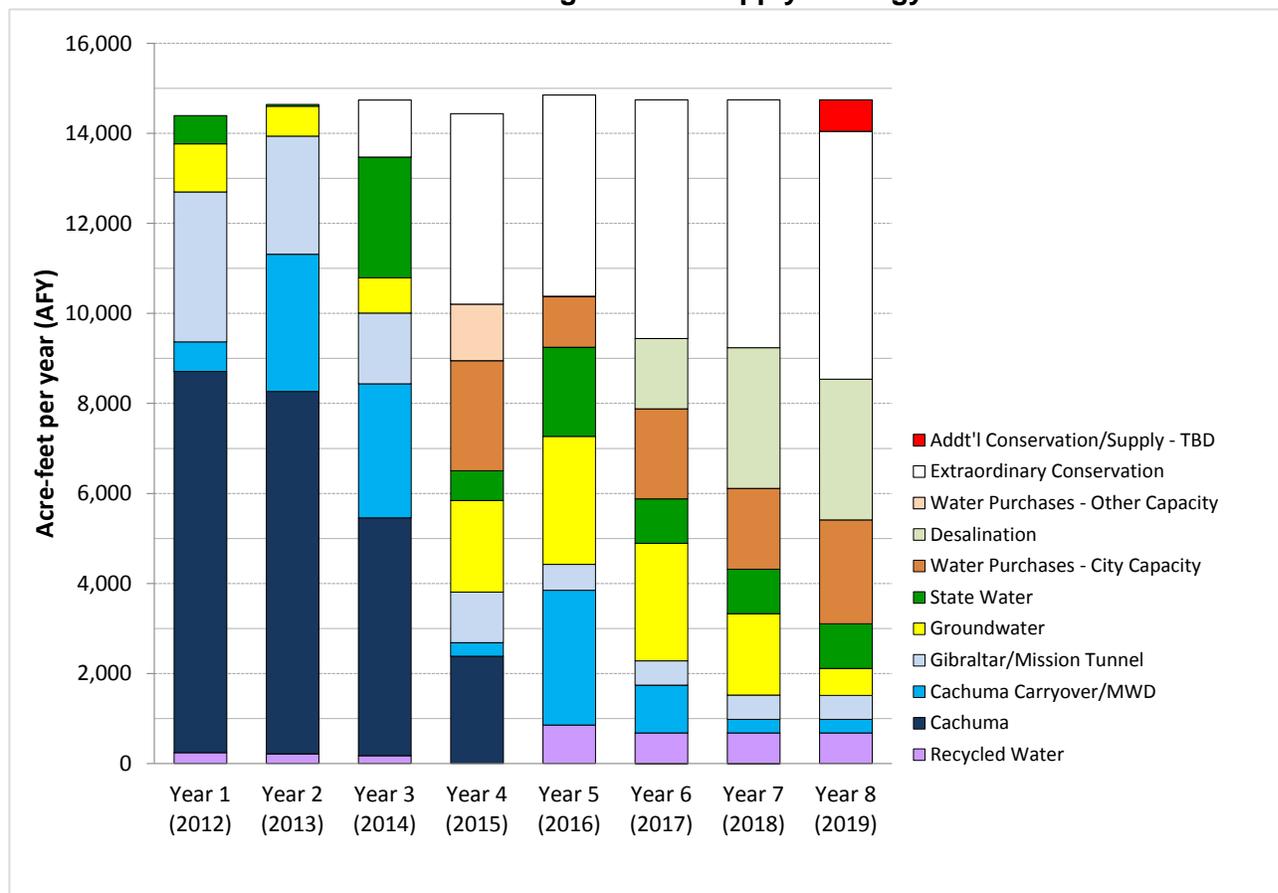
Recent History of Lake Cachuma Storage Levels (AF) With 1987-1994 Period Shown for Comparison



Under the adopted 2011 LTWSP, the City's planned water supply meets 100% of unrestricted customer demand in most years and no less than 85% of demand during the latter portion of a 6-year period of below average rainfall, which defines our "critical drought period." When rainfall is below average, there is limited inflow to Lake Cachuma and the storage level continues to drop. Our management plan assumes the first year after a spill at Cachuma may be the first year of a 6-year critical drought period.

Figure 4 shows a projection of the current water supply strategy over an 8-year period. Since 2011 was the last spill at Lake Cachuma, 2016 was Year 5 of a critical drought period, and we are now in Year 6. The 2011 LTWSP drought water supply strategy is based on available supply during the 1947-52 critical drought period, which was considered the “design drought” for planning purposes. Because the current historic drought has been worse than the “design drought”, the current drought supply strategy has been adapted to reflect a more conservative assumption of 1) no additional inflows to Gibraltar or Cachuma; and 2) a 30 percent Table A allocation of State Water. These assumptions are based on an extended duration of recent drought conditions.

**Figure 4.
Current Drought Water Supply Strategy**



The supply strategy reflects the management policies adopted in the 2011 LTWSP; however, the planned demand reduction was increased to 35% for WY16, meaning supplies are targeted to meet 65% of unrestricted customer demand. This is consistent with Governor Brown’s January 2014 declaration of drought state of emergency, April 2015 mandate for a State-wide 25% demand reduction and May 2016 executive order mandating continued water savings as the drought persists.

The City Council declared a Stage One Drought condition on February 11, 2014, Stage Two Drought condition on May 20, 2014, and Stage Three Drought condition on May 5, 2015. On December 6, 2016, the City amended its Stage 3 Drought Condition to increase the City’s water conservation target to a 40% reduction, based on local water supply conditions. The City’s adopted 2011 Water Shortage Contingency Plan outlines the stages of drought and actions to achieve planned demand reductions. A Stage 3 Drought condition is the most critical

stage. Under the current Stage 3 Drought condition, the City Council adopted regulations for drought water use restrictions and adopted drought based water rates. In addition, public outreach and messaging has increased to communicate the status of drought conditions and need for extraordinary water conservation.

MONITORING OF WATER SUPPLY AND DEMAND

Water demand has historically been measured by total water supply production, which is the total amount of supply from all sources to serve demands on the potable and recycled distribution systems. New State requirements for water conservation have established a “20% by 2020” target based on gallons per capita per day (GPCD) for potable water use. Since the supply production numbers provide historical context on our demand, and per capita water use is the new mandatory metric, both are being tracked. Figure 2.A illustrates the historical tracking of demands based on total water supply produced. Total water production was 10,033 AF for 2016 (excluding water produced for El Estero process demands). Figure 2B shows monthly potable water GPCD water use values, as well as a moving 12-month GPCD average. Usage for 2016 was 87 GPCD. In both charts, demands show a decline beginning 2014 in response to the Stage 2 and 3 drought conditions requiring mandatory reductions in water use.

Figure 2.A.

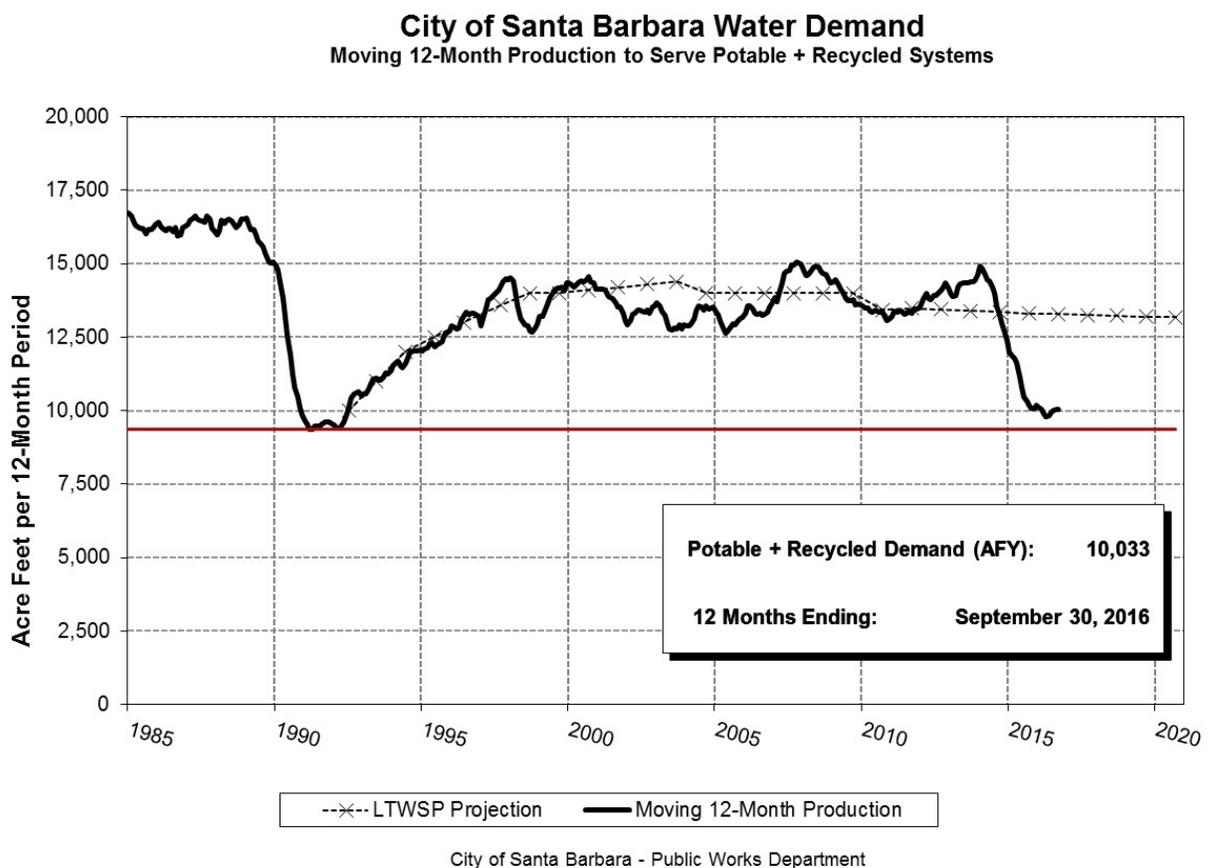
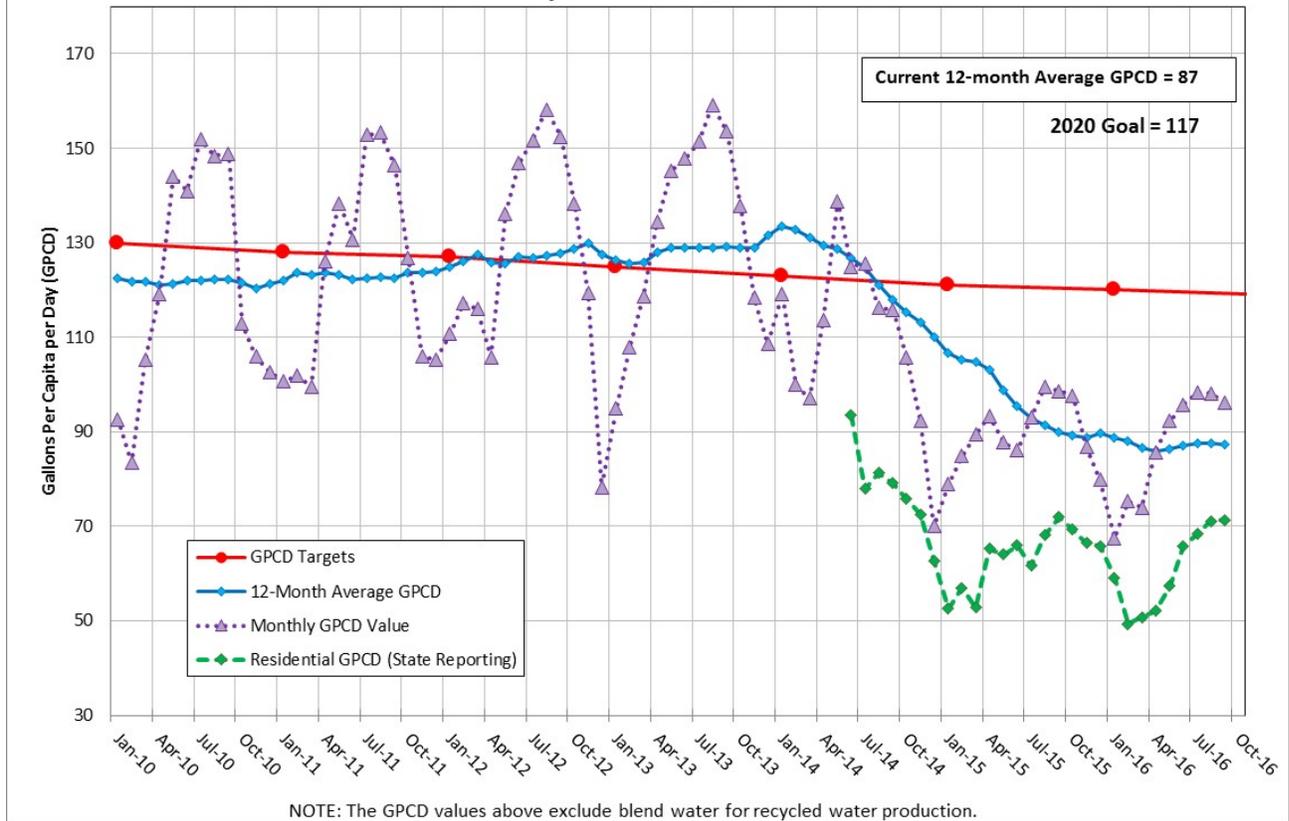


Figure 2.B.

City of Santa Barbara Water Use in Gallons Per Capita per Day (GPCD) September 30, 2016



CITY WATER CONSERVATION PROGRAM

In accordance with the LTWSP, the Water Conservation Program is operated to minimize the use of potable water supplies, meet the requirements of the California Urban Water Conservation Council Best Management Practices, and achieve compliance with the State's 20% x 2020 per capita water use reductions. Water conservation measures are evaluated for cost effectiveness based on the avoided cost of additional water supplies. Highlights of the City's Water Conservation Program include the following activities:

- **Free Water Checkups:** Checkups are provided to all water customers to assist in evaluating water usage indoor and out and to offer efficiency recommendations. 1,440 free water checkups were provided in Water Year 2016.
- **Landscape Training:** Lectures and workshops geared toward homeowners and landscape professionals; many in conjunction with horticultural organizations and local irrigation stores. Highlights from Water Year 2016 include: 4 Graywater 101 classes, 4 Rainwater Harvesting 101 classes, 9 hands-on workshops for water wise landscape installations, a hands-on drip irrigation class, and a Water Wise Home Demonstration Garden grand opening and tour with the Santa Barbara Botanic Garden.
- **Smart Landscape Rebate Program:** 50% rebate on eligible, pre-approved material costs for landscape water efficiency. 411 pre-inspections were completed and 328 rebates were issued in Water Year 2016.

- **Marketing and Outreach:** Continuing to implement the comprehensive South Coast Water Conservation Marketing Plan and the Drought Response Marketing Plan. Highlights from Water Year 2016 include: increased training for landscape professionals, countywide advertising about landscape transformations in conjunction with other water providers and the County, frequently updated information on our drought webpage, and providing guest speakers to neighborhood and community organizations.
- **Water Education Program:** Free in-class presentations, tours to the El Estero Wastewater Treatment Plant, and school assemblies with music to highlight where our water comes from and how to conserve it. 2,676 students were reached in Water Year 2016.
- **Additional Programs in Water Year 2016:** 49 high efficiency washing machine rebates; 2,205 free sprinkler nozzles redeemed; and 494 free mulch delivery participants.

Workload for the Water Conservation Program continues to remain high as a result of the drought with significant increases in staff responses required for normal program activities including to water checkups, rebate pre-inspections, waste of water enforcements.

CAPITAL PROJECTS

Staff continues work on a number of projects to improve the reliability and maintain quality of City water supplies:

- ***Cachuma Emergency Pump Project:*** Cachuma Operation and Maintenance Board was the lead agency responsible for construction of the pumping project on behalf of the South Coast Cachuma Member Units. Due to severe drought conditions, the gravity fed conveyance system to receive water from Lake Cachuma was anticipated to no longer be operable as the lake level fell below the intake portal to the South Coast Conduit. The Cachuma Emergency Pump Project (EPP) was necessary to allow for continued use of allocated Cachuma water and conveyance of State Water (via Cachuma). This project consisted of a pumping system to convey water from low lake levels to the intake portal of the South Coast Conduit, including installation of 3,600 feet of pipeline and placement of seven pumps on a floating barge. Additionally, sediment blocking the lowest intake portal was dredged to allow for the intake of water at lower elevations. The Cachuma EPP has been in operation since August 2015. In July 2016, COMB relocated the pumping barge to a deeper part of the lake. COMB is currently working on preliminary design and permitting of a potential permanent installation of the EPP pipelines to decrease risk of water supply outages, reduce long-term operating costs, and eliminate potential damage to facilities. COMB also continues to monitor lake level projections to assess a potential pipeline extension for continued conveyance of State Water, should that be necessary in the event the lake can no longer serve as a conveyance facility due to impacts of evaporation with continued drought conditions.
- ***Recycled Water Treatment Plant Rehabilitation:*** On November 2, 2015 the newly rehabilitated recycled water treatment facility went online. This project rehabilitated the original treatment plant that was built in 1989. The goal of this project was to eliminate or significantly reduce the need to use potable water for blending to meet water quality regulations and to position the plant to meet more stringent water quality requirements in the future. In 2016, only 64 AF of potable water was used for blending compared with

673 AF in 2015, marking a significant reduction in potable water use as a result of the project.

- **Groundwater Well Projects:** Groundwater is an important part of the City's water supply to meet peak demands, provide back-up for depleted surface supplies during drought, and provide an emergency water supply in the event of catastrophic supply interruptions, such as tunnel failure. Projects to maximize well production were completed in 2016 and no projects are currently underway, although the City maintains an on-call groundwater consulting services contract to respond quickly should well repair or maintenance projects become necessary. The following is a summary of well status:

Storage Unit #1 Basin:

- *Corporation Yard:* Online.
- *Alameda:* Online.
- *High School:* Online.
- *Vera Cruz:* Offline due to water quality issues.
- *City Hall:* Online.
- *Ortega:* Offline due to need for major rehabilitation or replacement.

Foothill Basin:

- *San Roque:* Online.
- *Hope:* Online.
- *Los Robles:* Online.

Storage Unit #3:

- *Valle Verde Well:* Non-potable well utilized to augment supply to the recycled water system.

- **Charles E. Meyer Desalination Facility:** Due to the severity of the present drought, the City is reactivating the Charles E. Meyer desalination facility. In July 2015, City Council authorized execution of a contract for design and construction services for reactivating the desalination facility. The initial construction phase currently underway will provide up to 3,125 AFY of supply. Construction is anticipated to be complete by Feb-March 2017. Per the adopted 2011 LTWSP, the primary role of the desalination facility is a drought relief measure. With the investment now being made to reactivate this facility, the long-term role of this supply will need to be revisited as part of a future update to the LTWSP.

WATER SUPPLY ISSUES

There are a number of significant issues related to the City's water supplies, discussed briefly below.

Long-Term Water Supply Plan: The City's 2011 Long-Term Water Supply Plan (LTWSP) was the product of numerous technical studies and over a year-long collaboration between staff and the Water Commission to appropriately quantify our water supplies and develop policies to guide our water supply management over the next twenty years. The plan is available to the public on the City's website at the following address:

www.SantaBarbaraCA.gov/Drought

The next LTWSP Update is anticipated to be initiated in 2017, once we know more information regarding the duration of the current historic drought and its basis for a new "design drought".

The LTWSP is the basis for the City's State-mandated Urban Water Management Plan (UWMP), which is required to be updated every five years. Compliance with the State's Urban Water Management Planning Act maintains the City's eligibility for State grants and loans. The most recent UWMP Update was adopted by City Council on June 28, 2016 and submitted to the State by the July 2016 deadline. At this time, the policies outlined in the City's 2011 LTWSP remain the basis for the 2016 UWMP Update. A future LTWSP Update would be incorporated into the next round of UWMP updates (occurring every 5 years).

Potable Reuse Feasibility Study: As directed by Council and required by the City's amended National Pollutant Discharge Elimination System (NPDES) permit, staff is evaluating the feasibility of alternatives to the screened ocean intake for the desalination facility, including subsurface intakes and potable reuse. Information regarding the study can be found at the following website: <http://www.nwri-usa.org/santa-barbara-panel.htm> The findings and intended implementation actions will be presented to the Regional Water Quality Control Board at a public meeting, no later than June 30, 2017

Potable reuse refers to advanced treatment (purification) of recycled water for drinking water purposes. There are two concepts for potable reuse: indirect potable reuse (IPR) and direct potable reuse (DPR). Current State regulations allow for IPR, in which purified recycled water is held within an environmental storage buffer, such as a groundwater basin, for a certain period of time prior to use for drinking water supply. The purpose of the environmental storage buffer is to provide sufficient response time should there be a failure in the recycled water treatment system. While the State does not currently have uniform recycling criteria (regulations) for DPR, the concept proposes to use an engineered buffer in lieu of an environmental buffer. In some but not all cases, DPR has the potential to increase supply yield and/or reduce facility costs.

In September 2016, the State Water Resources Control Board released a draft report on its investigation of the feasibility of developing regulations for DPR. The findings of the draft report are generally that regulations are feasible, but data gaps exist and additional research is needed before adopting regulations. Comments on the draft report were submitted by City staff, urging the State to develop a timeline for completing necessary research and developing future regulations. Understanding this timeline will be critical for evaluating potable reuse as an option in the City next LTWSP update.

Cachuma Project State Water Rights Draft Order: In September 2016, the State Water Resources Control Board (SWRCB) released a long-awaited draft order amending the Bureau of Reclamation's Water Rights for the Cachuma Project. The draft order finds that the Santa Ynez River steelhead population is "unlikely to reach good condition without additional flows and habitat for spawning and rearing fish". Most notable of the draft order requirements is the release of additional flows downstream of Bradbury Dam, in addition to those required by the National Marine Fisheries Service's 2000 Biological Opinion mandating minimum flow rates and other measures to prevent extinction of steelhead below Bradbury Dam. City staff is working with the Cachuma Conservation Release Board to prepare comments on the draft order, which are due December 9, 2016. The SWRCB decision is important to the City because it could affect the amount of water available from Lake Cachuma for water supply purposes.

Cachuma Project Biological Opinion: In 2000, a Biological Opinion was issued by the National Marine Fisheries Service (NMFS) for Reclamation's operation and maintenance of

Bradbury Dam (the Cachuma Project). NMFS is the agency that oversees protection of Southern California steelhead. The BO addresses the effects of the proposed Cachuma Project operations on steelhead and its designated critical habitat in accordance with Section 7 of the Endangered Species Act of 1973. Reclamation and the Cachuma Project Water Agencies have developed the proposed revisions to the Project operations since 1993 to improve habitat conditions for steelhead trout while still maintaining water supplies. In 2014, the NMFS formally initiated a reconsultation of the Biological Opinion. A draft BO revision is anticipated in December 2016. Similar to the State water rights decision, the revised BO is important because it could affect Cachuma Project operations and the amount of water available for water supply purposes.

Cachuma Contract 2020: Since the construction of the Cachuma Project, the Santa Barbara County Water Agency has been the formal contractor with Reclamation. In turn, the City and other Cachuma Member Units hold subcontracts with the County Water Agency. The current Cachuma Contract is set to expire on September 30, 2020, and it is expressly defined that any request to renew the Water Service Contract shall be made no less than two years prior to the date of the expiration of the current contract. On July 12, 2016, the Santa Barbara County Board of Supervisors authorized its staff to contact Reclamation to determine the process and timeline for negotiating the renewal of the Water Supply Contract and return to the Board for direction. Execution of a contract will be subject to NEPA/CEQA.

Gibraltar Pass Through Operations: The 2007 Zaca Fire burned approximately 60% of the Gibraltar Reservoir watershed, which normally contributes up to 35% of the City's water supply. On top of historical siltation, the additional sediment load resulting from the fire reduced the reservoir's storage capacity by 1,535 AF, leaving a current storage volume of about 5,250 AF. In 1989, the City entered into the Upper Santa Ynez River Operations Agreement (the "Pass Through Agreement") with other Santa Ynez River water agencies. The City agreed to defer its planned enlargement of Gibraltar Reservoir in exchange for provisions that would allow the City to "pass through" a portion of its Gibraltar water to Lake Cachuma for storage and delivery through Cachuma Project facilities. Due to the Zaca Fire effects, the City has elected to commence this phase of operations and is working with the Reclamation to negotiate a "Warren Act" contract as the preferred approach of accounting for the City's Pass Through water. In order to execute any Warren Act contract, Reclamation must prepare an environmental assessment under the National Environmental Policy Act (NEPA). Reclamation released a draft environmental assessment that has gone through public review, and the final is anticipated to be released in early 2017. Staff is concurrently reviewing and negotiating a draft Warren Act Contract. In anticipation of a potential Gibraltar spill event this winter, staff is also considering alternative accounting approaches should the Warren Act contract be further delayed. The Pass Through operations will allow the City to stabilize its Gibraltar deliveries as the reservoir continues to fill with sediment. An updated assessment of sediment management options is also planned, per the LTWSP.

State Water Project/Delta Issues: Significant issues include:

- **Delta Issues:** The Sacramento-San Joaquin Delta is a critical conveyance link for all water moved to the south by the State Water Project (SWP). However, the reliability of State Water supply is at risk due to drought, environmental restrictions, and seismic events. The Bay Delta Conservation Plan (BDGP) proposed a solution to balance coequal goals of water supply and environmental benefits. A Draft Environmental Impact Report (EIR) and Draft Environmental Impact Statement

(EIS) for the BDCP were made available for public review from December 2013 to July 2014.

In April 2015, State and Federal agencies announced a new alternative which would replace the BDCP as the State's proposed project. The new alternative reflects the state's proposal to separate the conveyance facility and habitat restoration measures into two separate efforts: California WaterFix and California EcoRestore. These two efforts are a direct reflection of public comments on the BDCP EIR/EIS and fulfill the requirement of the 2009 Delta Reform Act to meet co-equal goals.

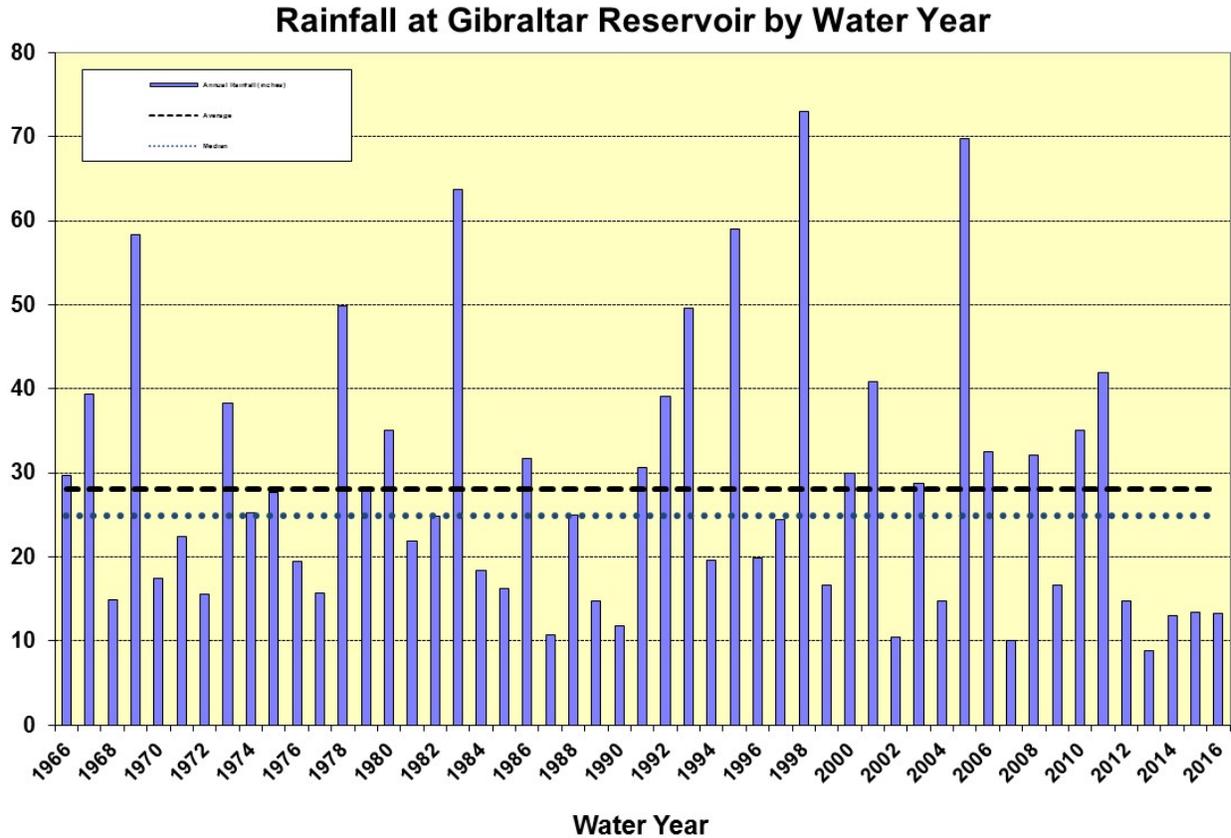
A Recirculated Draft Environmental Impact Report (RDEIR)/Supplemental Draft Environmental Impact Statement (SDEIS) that incorporates the California WaterFix alternative were made available for public review and comment from July 2015 through October 2015. No final decisions have been made regarding California WaterFix or in selecting an alternative; those decisions will only occur after the completion of the CEQA and NEPA processes. The Final EIR/EIS is currently being prepared, although a schedule has not been released.

- **CCWA Contract Extension:** The City receives State Water through the Central Coast Water Authority (CCWA), a regional wholesale water provider for areas within Santa Barbara County and San Luis Obispo County. Santa Barbara County's contract for State Water is set to expire in 2035. CCWA is negotiating a contract extension with DWR as well as other contract amendments.
- **State Water Storage Programs:** The City relies on State Water to a limited extent, but it can be an important source of water for banking as a way of increasing the reliability of our water supply. Through CCWA, the City has previously stored State Water in groundwater banking programs in the western San Joaquin Valley. The City will continue to work with CCWA to look for cost-effective groundwater banking opportunities that improve reliability and avoid loss of State Water during future San Luis Reservoir spill events.

Groundwater Management Plan: The City has relatively small groundwater storage, but it plays an important part in meeting demand during drought periods. It is also our only currently active potable water supply that is truly local. The latter is important in the event of a catastrophic interruption of water supplies from one or both tunnels through the Santa Ynez Mountains. During 2013, staff continued efforts to develop a formal Groundwater Management Plan to ensure that groundwater resources are managed so as to be available to contribute to the City's water supply during normal years, drought periods, and emergency conditions. Due to drought workload and competing priorities since 2013, development of the formalized GMP was put on hold. However, this effort is expected to be ramped up again and will address the State of California's newly adopted Sustainable Groundwater Act of 2014. For State-ranked priority basins, the act requires the formation of a local groundwater sustainability agency that must assess conditions in their local water basins and adopt locally-based management plans. The Sustainable Groundwater Management Act provides local GSAs with tools and authority to 1) require registration of groundwater wells, 2) measure and manage extractions, 3) require reports and assess fees, and 4) request revisions of basin boundaries, including establishment of new sub-basins.

Appendix A – Supplemental Water Supply Information

Long-Term Rainfall Data



Groundwater Balance

Project conditions of the State Water Project (SWP) require the City to use SWP water to offset any demonstrated groundwater basin overdraft. Under the LTWSP, the City uses groundwater conjunctively with surface supplies, such that significant groundwater use only occurs when surface supplies are reduced. In response to the current unprecedented drought, groundwater pumping increased in Water Year 2015 and 2016 providing a critical water supply. Groundwater basins are rested following periods of heavy pumping to allow water levels to recover.

The estimated groundwater yield available to the City over a 5-year drought period is based on previous numerical groundwater modeling performed by the United States Geological Survey. As summarized in Table A-1, the estimated yield for City use is 7,418 AF in Storage Unit I and 5,563 AF in Foothill Basin. The City's pumping over the last 5 years is shown for comparison. In addition, any significant City pumping from storage that occurred prior to the drought is shown. In normal conditions, the City limits pumping to be equal or less than its share of the perennial yield. However, in 2005-2011, some additional pumping from Foothill Basin storage reserves was necessary in order to meet drinking water quality regulations prior to completion of the Cater Ozone project. To estimate the remaining groundwater storage available, the City's actual pumping over the last 5 years was accounted for, as well as the as well as previous City pumping from storage (or pumping that exceeded its estimated share of the perennial yield). Based on the remaining yield, and the City's primary groundwater basins are in long-term balance with no overdraft projected in the next year.

However, it is anticipated the basins will be close to exhausted in 2018-2019 should the extreme drought condition continue. The City has factored this into its water supply planning (see reduced groundwater supply in Figure 4) such that the City does not plan to use groundwater beyond the estimated remaining yield in order to prevent overdraft conditions.

Table A-1. Groundwater Balance

Storage Unit 1 Basin	
Estimated 5-Year Drought Storage Yield for City Use ¹ :	7,418 AF
City Groundwater Production last 5 years (October 2011 – September 2016):	4,207 AF
Previous City Use of Groundwater Storage (October 2005 – September 2011) ² :	0 AF
Remaining 5-Year Drought Storage Yield for City Use:	3,211 AF
Projected City Groundwater Production for 2017:	2,006 AF
Foothill Basin	
Estimated 5-Year Drought Storage Yield for City Use ¹ :	5,563 AF
City Groundwater Production last 5 years (October 2011 – September 2016):	3,192 AF
Previous City Use of Groundwater Storage (October 2005-September 2011) ² :	740 AF
Remaining 5-Year Drought Storage Yield for City Use:	1,631 AF
Projected City Groundwater Production for 2017:	638 AF
¹ Nishikawa, 1998. USGS Report 97-4246A <i>Simulation/Optimization Model for Water Resources Management, Santa Barbara, CA</i> , Tables A-14 and A-15. ² This represents City pumping exceeding the assumed perennial yield available to the City, thereby drawing from stored groundwater reserves. The assumed perennial yield available to the City is 450 AFY from Foothill and 800 AFY from Storage Unit I (source: City of Santa Barbara 2015 Urban Water Management Plan). Note that in WY 2008-2010, the City increased pumping from Foothill Basin to meet water quality regulations as required prior to completion of the Cater Ozone project.	

The City used non-potable groundwater from Valle Verde well located in Storage Unit III to augment supply to the recycled system as needed. The City pumped a total of 22 AF from Valle Verde well during the 2016 water year, which is less than the historical maximum annual pumping by the City of 216 AF in 1990. The estimated average annual Storage Unit III yield available for use by the City is approximately 100 AFY. Valle Verde will continue to be used as needed during short periods when the recycled water plant is offline for repair or maintenance.

Projection of Supply Availability

Table A-2 summarizes the City's water supply sources and fulfills a requirement of the project conditions for the SWP. The Water Year (WY) 2016-2017 Supply Plan reflects a projected total demand of 9,466 AF including ~180 AF for El Estero process water, which reflects a 35% potable water reduction through January and a 40% potable water reduction through the remainder of the water year, based on the current Stage Three Drought condition.

Table A-2. Sources of Supply (AF)

Source of Supply	WY 2016 Original Supply Plan	WY 2016 Actual	WY 2017 Supply Plan (Projected)
Gibraltar Reservoir	0	0	0
Cachuma Project	3,646	2,993	972
Mission Tunnel	615	574	529
Devil's Canyon	0	0	0
Juncal Res. (300 AF from MWD)	(w/ Cachuma)	(w/ Cachuma)	(w/ Cachuma)
State Water /Water Purchases	3,303	3,113	3,063
Groundwater (potable) ^A	2,882	2,845	2,634
Desalination	0	0	1,563
Recycled Water	840	834	705
Groundwater (non-potable) ^A	0	22	0
Net Other Supplies ^B	(na)	-169	(na)
Total Production:	11,286	10,212	9,466
Total Demand:	11,286 ^C	10,212 ^D	9,466

^A The City uses potable groundwater supply from Storage Unit I and Foothill, and non-potable groundwater supply from Storage Unit III.

^B Represents miscellaneous production sources (positive values) and water used from the distribution system for purposes such as transfers to adjacent water purveyors or groundwater recharge.

^C Planned demands include ~180 AFY for El Estero process water.

^D Actual 2016 demand includes 9,293 AFY potable demand, 741 AFY recycled demand, and 178 AFY El Estero process demand.